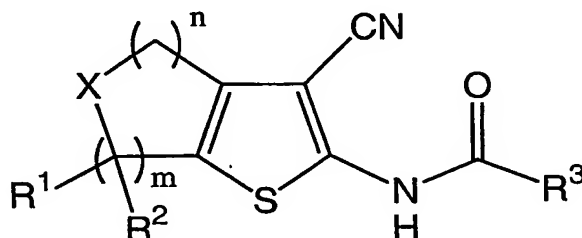


WHAT IS CLAIMED IS:

1. A method of treating type 2 diabetes mellitus in a mammalian patient in need of such treatment, which comprises administering to said patient an anti-diabetic effective amount of a compound represented by formula I:



or a pharmaceutically acceptable salt or solvate thereof wherein:

X is CR⁵R⁶;

at least one of R¹, R², R⁵ and R⁶ is present that is other than H;

R¹ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents independently selected from R¹³;

R² is selected from the group consisting of: R¹ as defined above, -C(O)₂R⁷ and -CONR⁷R⁸;

m and n are selected from 0, 1, 2 and 3, such that the sum of m and n is 2 or 3, and when m is greater than 1, no more than one R¹ and no more than one R² can be other than H;

R³ is selected from the group consisting of: C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R¹³, such that when R³ represents C₁₋₁₀ alkyl substituted with one R¹³ group, and R¹³ represents halo, R¹, R², R⁵ and R⁶ do not represent C₁₋₃alkyl;

R⁵ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R¹³;

R⁶ is selected from the group consisting of: R¹ as defined above, HAR, Hetcy, and OR¹¹, wherein said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³,

or R⁵ and R⁶ can be taken in combination with the carbon atom to which they are attached and represent -O-(CH₂)₁₋₂-O- or -C(O)-;

R⁷, R¹⁰ and R¹¹ are selected from the group consisting of: R¹ as defined above,

HAR and Hetcy, said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³;

R⁸, R⁹ and R¹² are selected from the group consisting of: C₁₋₁₀alkyl, C₃₋₇cycloalkyl, Aryl, HAR and Hetcy, said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³;

or alternatively, R⁷, R⁸, R⁹ and R¹⁰ are as defined above, and R¹¹ and R¹² are taken together with the atoms to which they are attached and form a 5-8 membered ring optionally containing 1-2 heteroatoms selected from O, S and N, and optionally substituted with 1-4 substituents selected from R¹³;

each R¹³ is selected from the group consisting of: halo, NR¹⁴R¹⁵, C₁₋₄alkyl, C₃₋₇cycloalkyl, Aryl, HAR, Hetcy, CF₃, OCF₃, OR¹⁵, NO₂, S(O)_xR¹⁴, SR¹⁴, S(O)_xNR¹⁴R¹⁵, O(CR¹⁶R¹⁷)_yNR¹⁴R¹⁵, C(O)R¹⁴, CO₂R¹⁵, CO₂(CR¹⁶R¹⁷)_yCONR¹⁴R¹⁵, OC(O)R¹⁴, CN, C(O)NR¹⁴R¹⁵, NR¹⁵C(O)R¹⁴, NR¹⁵C(O)OR¹⁴, NR¹⁵C(O)NR¹⁶R¹⁴ and CR¹⁵(N-OR¹⁴),

wherein x is 1 or 2, and y is an integer from 1-4, said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹⁸;

R¹⁴, R¹⁵, R¹⁶ and R¹⁷ are independently selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl, Aryl and Ar-C₁₋₁₀alkyl;

and each R¹⁸ is independently selected from the group consisting of: halogen, CN, C₁₋₄alkyl, OH, CF₃, Aryl, Aryloxy, CO₂H and CO₂C₁₋₄ alkyl, said Aryl and the Aryl portion of Aryloxy being optionally substituted with up to 4 halo groups, and up to 2 C₁₋₄ alkyl, OH, CF₃ or CN groups.

2. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein R¹ is selected from the group consisting of: H, C₁₋₆alkyl and C₃₋₆cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents independently selected from R¹³.

3. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein R² is selected from the group consisting of: H, C₁₋₆alkyl, C₃₋₆cycloalkyl, Aryl and C(O)NR⁷R⁸, said alkyl, cycloalkyl and Aryl groups being optionally substituted with 1-3 substituents independently selected from R¹³;

R⁷ is selected from the group consisting of: H and C₁₋₆ alkyl, optionally substituted with 1-3 R¹³ groups;

R^8 is selected from the group consisting of: C_{1-6} alkyl, C_{3-6} cycloalkyl, and Aryl, optionally substituted with 1-3 R^{13} groups;

each R^{13} is independently selected from the group consisting of: halo, Aryl, CF_3 and OCF_3 , and Aryl is optionally substituted with 1-3 R^{18} groups, which are each independently selected from halo, CH_3 , OH, CF_3 and CO_2H .

4. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein R^3 is selected from the group consisting of: C_{1-10} alkyl and C_{3-7} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} , such that when R^3 represents C_{1-10} alkyl substituted with one R^{13} group, and R^{13} represents halo, R^1 , R^2 , R^5 and R^6 do not represent C_{1-3} alkyl.

5. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein R^5 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} .

6. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein R^6 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} .

7. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein each R^{13} is selected from the group consisting of: halo, C_{1-4} alkyl, C_{3-6} cycloalkyl, Aryl, CF_3 and OCF_3 , and Aryl is optionally substituted with 1-3 R^{18} groups, which are independently selected from halo, CH_3 , OH, CF_3 and CO_2H .

8. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein:

R^1 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents independently selected from R^{13} ;

R^2 is selected from the group consisting of: H, C_{1-6} alkyl, C_{3-6} cycloalkyl, Aryl and $C(O)NR^7R^8$, said alkyl, cycloalkyl and Aryl groups being optionally substituted with 1-3 substituents independently selected from R^{13} ;

R^7 is selected from the group consisting of: H and C_{1-6} alkyl, optionally substituted with 1-3 R^{13} groups;

R^8 is selected from the group consisting of: C_{1-6} alkyl, C_{3-6} cycloalkyl, and Aryl, optionally substituted with 1-3 R^{13} groups;

each R^{13} is independently selected from the group consisting of: halo, Aryl, CF_3 and OCF_3 , and Aryl is optionally substituted with 1-3 R^{18} groups, which are each independently selected from halo, CH_3 , OH, CF_3 and CO_2H ;

R^3 is selected from the group consisting of: C_{1-10} alkyl and C_{3-7} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} , such that when R^3 represents C_{1-10} alkyl substituted with one R^{13} group, and R^{13} represents halo, R^1 , R^2 , R^5 and R^6 do not represent C_{1-3} alkyl;

R^5 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} ;

R^6 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} , and

each R^{13} is selected from the group consisting of: halo, C_{1-4} alkyl, C_{3-6} cycloalkyl, Aryl, CF_3 and OCF_3 , and Aryl is optionally substituted with 1-3 R^{18} groups, which are independently selected from halo, CH_3 , OH, CF_3 and CO_2H .

9. A method of treating type 2 diabetes mellitus in accordance with claim 1 wherein the compound administered is selected from the group consisting of:

N-(3-cyano-6-methyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-methylbutanamide;

N-(6-tert-butyl-3-cyano-4,5,6,7-tetrahydro-1-benzothien-2-yl)decanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)bicyclo[2.2.1]heptane-2-carboxamide;

N-(3-cyano-6-ethyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-phenylcyclopropanecarboxamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-phenylcyclopropanecarboxamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2,2,3,3-tetramethylcyclopropanecarboxamide;

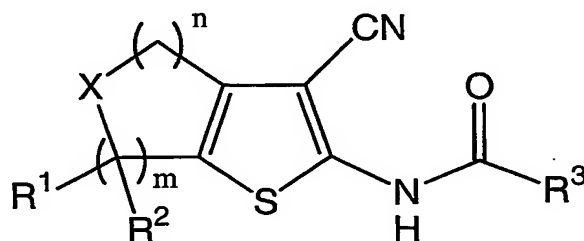
N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-cyclohexylpropanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-phenylpropanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3,3-dimethylbutanamide;

- N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-4,4,4-trifluoro-3-methylbutanamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2,2-dimethylpropanamide;
 N-(6-tert-butyl-3-cyano-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;
 5 N-(3-cyano-6-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;
 N-(3-cyano-6-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-5,5,7,7-tetramethyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-5-tert-pentyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-6-tert-pentyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
 10 N-(3-cyano-4,6-dimethyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-7-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide; and
 3-cyano-N-(2,4-dichlorobenzyl)-2-[(2-ethylbutanoyl)amino]-N-isopropyl-4,5,6,7-tetrahydro-1-benzothiophene-7-carboxamide.

- 15 10. A pharmaceutical composition comprised of a compound represented by formula I:



or a pharmaceutically acceptable salt or solvate thereof in combination with a pharmaceutically acceptable carrier, wherein:

- 20 X is CR⁵R⁶;
 at least one of R¹, R², R⁵ and R⁶ is present that is other than H;
 R¹ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl,
 said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents independently
 selected from R¹³;
 25 R² is selected from the group consisting of: R¹ as defined above, -C(O)₂R⁷ and -
 CONR⁷R⁸;
 m and n are selected from 0, 1, 2 and 3, such that the sum of m and n is 2 or 3, and
 when m is greater than 1, no more than one R¹ and no more than one R² can be other than H;
 R³ is selected from the group consisting of: C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl,
 30 said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from

R^{13} , such that when R^3 represents C_{1-10} alkyl substituted with one R^{13} group, and R^{13} represents halo, R^1 , R^2 , R^5 and R^6 do not represent C_{1-3} alkyl;

R^5 is selected from the group consisting of: H, C_{1-10} alkyl, C_{3-7} cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R^{13} ;

R^6 is selected from the group consisting of: R^1 as defined above, HAR, Hetcy, and OR^{11} , wherein said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R^{13} ,

or R^5 and R^6 can be taken in combination with the carbon atom to which they are attached and represent $-O-(CH_2)_{1-2}-O-$ or $-C(O)-$;

R^7 , R^{10} and R^{11} are selected from the group consisting of: R^1 as defined above, HAR and Hetcy, said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R^{13} ;

R^8 , R^9 and R^{12} are selected from the group consisting of: C_{1-10} alkyl, C_{3-7} cycloalkyl, Aryl, HAR and Hetcy, said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R^{13} ;

or alternatively, R^7 , R^8 , R^9 and R^{10} are as defined above, and R^{11} and R^{12} are taken together with the atoms to which they are attached and form a 5-8 membered ring optionally containing 1-2 heteroatoms selected from O, S and N, and optionally substituted with 1-4 substituents selected from R^{13} ;

each R^{13} is selected from the group consisting of: halo, $NR^{14}R^{15}$, C_{1-4} alkyl, C_{3-7} cycloalkyl, Aryl, HAR, Hetcy, CF_3 , OCF_3 , OR^{15} , NO_2 , $S(O)_xR^{14}$, SR^{14} , $S(O)_xNR^{14}R^{15}$, $O(CR^{16}R^{17})_yNR^{14}R^{15}$, $C(O)R^{14}$, CO_2R^{15} , $CO_2(CR^{16}R^{17})_yCONR^{14}R^{15}$, $OC(O)R^{14}$, CN, $C(O)NR^{14}R^{15}$, $NR^{15}C(O)R^{14}$, $NR^{15}C(O)OR^{14}$, $NR^{15}C(O)NR^{16}R^{14}$ and $CR^{15}(N-OR^{14})$,

wherein x is 1 or 2, and y is an integer from 1-4,

said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R^{18} ;

R^{14} , R^{15} , R^{16} and R^{17} are independently selected from the group consisting of: H, C_{1-10} alkyl, C_{3-7} cycloalkyl, Aryl and Ar- C_{1-10} alkyl;

and each R^{18} is independently selected from the group consisting of: halogen, CN, C_{1-4} alkyl, OH, CF_3 , Aryl, Aryloxy, CO_2H and CO_2C_{1-4} alkyl, said Aryl and the Aryl portion of Aryloxy being optionally substituted with up to 4 halo groups, and up to 2 C_{1-4} alkyl, OH, CF_3 or CN groups,

in combination with a pharmaceutically acceptable carrier.

11. A pharmaceutical composition in accordance with claim 10 wherein: R¹ is selected from the group consisting of: H, C₁₋₆alkyl and C₃₋₆cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents independently selected from R¹³.

12. A pharmaceutical composition in accordance with claim 10 wherein:
R² is selected from the group consisting of: H, C₁₋₆alkyl, C₃₋₆cycloalkyl, Aryl and C(O)NR⁷R⁸, said alkyl, cycloalkyl and Aryl groups being optionally substituted with 1-3 substituents independently selected from R¹³; R⁷ is selected from the group consisting of: H and C₁₋₆ alkyl, optionally substituted with 1-3 R¹³ groups;

R⁸ is selected from the group consisting of: C₁₋₆ alkyl, C₃₋₆ cycloalkyl, and Aryl, optionally substituted with 1-3 R¹³ groups;

each R¹³ is independently selected from the group consisting of: halo, Aryl, CF₃ and OCF₃, and Aryl is optionally substituted with 1-3 R¹⁸ groups, which are each independently selected from halo, CH₃, OH, CF₃ and CO₂H.

13. A pharmaceutical composition in accordance with claim 10 wherein R³ is selected from the group consisting of: C₁₋₁₀alkyl and C₃₋₇cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R¹³, such that when R³ represents C₁₋₁₀ alkyl substituted with one R¹³ group, and R¹³ represents halo, R¹, R², R⁵ and R⁶ do not represent C₁₋₃alkyl.

14. A pharmaceutical composition in accordance with claim 10 wherein R⁵ is selected from the group consisting of: H, C₁₋₆alkyl and C₃₋₆cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R¹³.

15. A pharmaceutical composition in accordance with claim 10 wherein R⁶ is selected from the group consisting of: H, C₁₋₆alkyl and C₃₋₆cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R¹³.

16. A pharmaceutical composition in accordance with claim 10 wherein each R¹³ is selected from the group consisting of: halo, C₁₋₄alkyl, C₃₋₆cycloalkyl, Aryl, CF₃ and OCF₃, and Aryl is optionally substituted with 1-3 R¹⁸ groups, which are independently selected from halo, CH₃, OH, CF₃ and CO₂H.

17. A pharmaceutical composition in accordance with claim 10 wherein:

R^1 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents independently selected from R^{13} ;

R^2 is selected from the group consisting of: H, C_{1-6} alkyl, C_{3-6} cycloalkyl, Aryl and $C(O)NR^7R^8$, said alkyl, cycloalkyl and Aryl groups being optionally substituted with 1-3 substituents independently selected from R^{13} ;

R^7 is selected from the group consisting of: H and C_{1-6} alkyl, optionally substituted with 1-3 R^{13} groups;

R^8 is selected from the group consisting of: C_{1-6} alkyl, C_{3-6} cycloalkyl, and Aryl, optionally substituted with 1-3 R^{13} groups;

each R^{13} is independently selected from the group consisting of: halo, Aryl, CF_3 and OCF_3 , and Aryl is optionally substituted with 1-3 R^{18} groups, which are each independently selected from halo, CH_3 , OH, CF_3 and CO_2H ;

R^3 is selected from the group consisting of: C_{1-10} alkyl and C_{3-7} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} , such that when R^3 represents C_{1-10} alkyl substituted with one R^{13} group, and R^{13} represents halo, R^1 , R^2 , R^5 and R^6 do not represent C_{1-3} alkyl;

R^5 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} ;

R^6 is selected from the group consisting of: H, C_{1-6} alkyl and C_{3-6} cycloalkyl, said alkyl and cycloalkyl being optionally substituted with 1-3 substituents selected from R^{13} , and

each R^{13} is selected from the group consisting of: halo, C_{1-4} alkyl, C_{3-6} cycloalkyl, Aryl, CF_3 and OCF_3 , and Aryl is optionally substituted with 1-3 R^{18} groups, which are independently selected from halo, CH_3 , OH, CF_3 and CO_2H . Within this aspect of the invention, all other variables are as originally defined.

18. A pharmaceutical composition in accordance with claim 10 wherein the

compound of formula I is selected from the group consisting of:

N-(3-cyano-6-methyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-methylbutanamide;

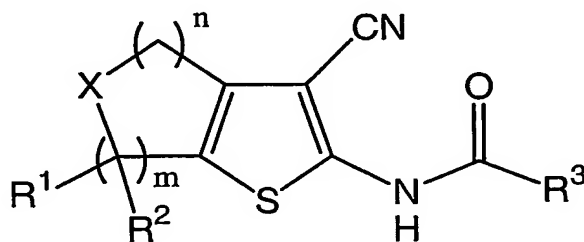
N-(6-tert-butyl-3-cyano-4,5,6,7-tetrahydro-1-benzothien-2-yl)decanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)bicyclo[2.2.1]heptane-2-

carboxamide;

- N-(3-cyano-6-ethyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-phenylcyclopropanecarboxamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-phenylcyclopropanecarboxamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;
 5 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2,2,3,3-tetramethylcyclopropanecarboxamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-cyclohexylpropanamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-phenylpropanamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3,3-dimethylbutanamide;
 10 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-4,4,4-trifluoro-3-methylbutanamide;
 N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2,2-dimethylpropanamide;
 N-(6-tert-butyl-3-cyano-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;
 N-(3-cyano-6-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;
 15 N-(3-cyano-6-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-5,5,7,7-tetramethyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-5-tert-pentyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-6-tert-pentyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
 N-(3-cyano-4,6-dimethyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
 20 N-(3-cyano-7-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide; and
 3-cyano-N-(2,4-dichlorobenzyl)-2-[(2-ethylbutanoyl)amino]-N-isopropyl-4,5,6,7-tetrahydro-1-benzothiophene-7-carboxamide.

19. A method of preventing or delaying the onset of type 2 diabetes mellitus in
 25 a mammalian patient in need of such treatment, comprising administering to said patient a compound represented by formula I:



I

or a pharmaceutically acceptable salt or solvate thereof wherein:

X is CR⁵R⁶;

at least one of R¹, R², R⁵ and R⁶ is present that is other than H;

5

R¹ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents independently selected from R¹³;

10 R² is selected from the group consisting of: R¹ as defined above, -C(O)₂R⁷ and -CONR⁷R⁸;

m and n are selected from 0, 1, 2 and 3, such that the sum of m and n is 2 or 3, and when m is greater than 1, no more than one R¹ and no more than one R² can be other than H;

15

R³ is selected from the group consisting of: C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R¹³, such that when R³ represents C₁₋₁₀ alkyl substituted with one R¹³ group, and R¹³ represents halo, R¹, R², R⁵ and R⁶ do not represent C₁₋₃alkyl;

20

R⁵ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R¹³;

25 R⁶ is selected from the group consisting of: R¹ as defined above, HAR, Hetcy, and OR¹¹, wherein said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³,

or R⁵ and R⁶ can be taken in combination with the carbon atom to which they are attached and represent -O-(CH₂)₁₋₂-O- or -C(O)-;

30

R⁷, R¹⁰ and R¹¹ are selected from the group consisting of: R¹ as defined above, HAR and Hetcy, said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³;

35

R⁸, R⁹ and R¹² are selected from the group consisting of: C₁₋₁₀alkyl, C₃₋

cycloalkyl, Aryl, HAR and Hetcy, said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³;

or alternatively, R⁷, R⁸, R⁹ and R¹⁰ are as defined above, and R¹¹ and R¹² are taken together with the atoms to which they are attached and form a 5-8 membered ring optionally containing 1-2 heteroatoms selected from O, S and N, and optionally substituted with 1-4 substituents selected from R¹³;

each R¹³ is selected from the group consisting of: halo, NR¹⁴R¹⁵, C₁₋₄alkyl, C₃₋₇-cycloalkyl, Aryl, HAR, Hetcy, CF₃, OCF₃, OR¹⁵, NO₂, S(O)_xR¹⁴, SR¹⁴, S(O)_xNR¹⁴R¹⁵, O(CR¹⁶R¹⁷)_yNR¹⁴R¹⁵, C(O)R¹⁴, CO₂R¹⁵, CO₂(CR¹⁶R¹⁷)_yCONR¹⁴R¹⁵, OC(O)R¹⁴, CN, C(O)NR¹⁴R¹⁵, NR¹⁵C(O)R¹⁴, NR¹⁵C(O)OR¹⁴, NR¹⁵C(O)NR¹⁶R¹⁴ and CR¹⁵(N-OR¹⁴),

wherein x is 1 or 2, and y is an integer from 1-4,

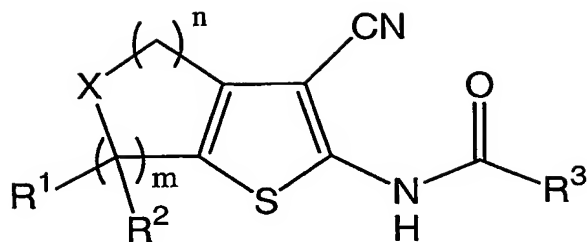
said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹⁸;

R¹⁴, R¹⁵, R¹⁶ and R¹⁷ are independently selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl, Aryl and Ar-C₁₋₁₀alkyl;

and each R¹⁸ is independently selected from the group consisting of: halogen, CN, C₁₋₄alkyl, OH, CF₃, Aryl, Aryloxy, CO₂H and CO₂C₁₋₄ alkyl, said Aryl and the Aryl portion of Aryloxy being optionally substituted with up to 4 halo groups, and up to 2 C₁₋₄ alkyl, OH, CF₃ or CN groups,

said compound being administered in an amount that is effective to prevent or delay the onset of type 2 diabetes mellitus.

20. A method of treating, preventing or delaying the onset of a disease or condition in a type 2 diabetes mellitus patient, said disease or condition being selected from the group consisting of: dyslipidemia selected from elevated serum cholesterol, elevated serum triglycerides, elevated serum low density lipoproteins and low levels of serum high density lipoprotein, microvascular or macrovascular changes and the sequelae of such conditions selected from coronary heart disease, stroke, peripheral vascular disease, hypertension, renal hypertension, nephropathy, neuropathy and retinopathy, said method comprising administering to the type 2 diabetic patient an amount of a compound of formula I:



I

or a pharmaceutically acceptable salt or solvate thereof wherein:

X is CR⁵R⁶;

at least one of R¹, R², R⁵ and R⁶ is present that is other than H;

5 R¹ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents independently selected from R¹³;

R² is selected from the group consisting of: R¹ as defined above, -C(O)₂R⁷ and -CONR⁷R⁸;

10 m and n are selected from 0, 1, 2 and 3, such that the sum of m and n is 2 or 3, and when m is greater than 1, no more than one R¹ and no more than one R² can be other than H;

R³ is selected from the group consisting of: C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R¹³, such that when R³ represents C₁₋₁₀ alkyl substituted with one R¹³ group, and R¹³ represents
15 halo, R¹, R², R⁵ and R⁶ do not represent C₁₋₃alkyl;

R⁵ is selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl and Aryl, said alkyl, cycloalkyl and Aryl being optionally substituted with 1-4 substituents selected from R¹³;

20 R⁶ is selected from the group consisting of: R¹ as defined above, HAR, Hetcy, and OR¹¹, wherein said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³,

or R⁵ and R⁶ can be taken in combination with the carbon atom to which they are attached and represent -O-(CH₂)₁₋₂-O- or -C(O)-;

25 R⁷, R¹⁰ and R¹¹ are selected from the group consisting of: R¹ as defined above, HAR and Hetcy, said HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³;

R⁸, R⁹ and R¹² are selected from the group consisting of: C₁₋₁₀alkyl, C₃₋₇cycloalkyl, Aryl, HAR and Hetcy, said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹³;

or alternatively, R⁷, R⁸, R⁹ and R¹⁰ are as defined above, and R¹¹ and R¹² are taken together with the atoms to which they are attached and form a 5-8 membered ring optionally containing 1-2 heteroatoms selected from O, S and N, and optionally substituted with 1-4 substituents selected from R¹³;

each R¹³ is selected from the group consisting of: halo, NR¹⁴R¹⁵, C₁₋₄alkyl, C₃₋₇-cycloalkyl, Aryl, HAR, Hetcy, CF₃, OCF₃, OR¹⁵, NO₂, S(O)_xR¹⁴, SR¹⁴, S(O)_xNR¹⁴R¹⁵, O(CR¹⁶R¹⁷)_yNR¹⁴R¹⁵, C(O)R¹⁴, CO₂R¹⁵, CO₂(CR¹⁶R¹⁷)_yCONR¹⁴R¹⁵, OC(O)R¹⁴, CN, C(O)NR¹⁴R¹⁵, NR¹⁵C(O)R¹⁴, NR¹⁵C(O)OR¹⁴, NR¹⁵C(O)NR¹⁶R¹⁴ and CR¹⁵(N-OR¹⁴),

wherein x is 1 or 2, and y is an integer from 1-4, said alkyl, cycloalkyl, Aryl, HAR and Hetcy being optionally substituted with 1-4 substituents selected from R¹⁸;

R¹⁴, R¹⁵, R¹⁶ and R¹⁷ are independently selected from the group consisting of: H, C₁₋₁₀alkyl, C₃₋₇cycloalkyl, Aryl and Ar-C₁₋₁₀alkyl;

and each R¹⁸ is independently selected from the group consisting of: halogen, CN, C₁₋₄alkyl, OH, CF₃, Aryl, Aryloxy, CO₂H and CO₂C₁₋₄ alkyl, said Aryl and the Aryl portion of Aryloxy being optionally substituted with up to 4 halo groups, and up to 2 C₁₋₄ alkyl, OH, CF₃ or CN groups,

said compound being administered in an amount that is effective to treat, prevent, or delay the onset of such disease or condition.

21. A compound selected from the group consisting of:

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2,2,3,3-

tetramethylcyclopropanecarboxamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-cyclohexylpropanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3-phenylpropanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-3,3-dimethylbutanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-4,4,4-trifluoro-3-

methylbutanamide;

N-(3-cyano-6-tert-pentyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2,2-dimethylpropanamide;

N-(6-tert-butyl-3-cyano-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;

N-(3-cyano-6-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)cyclopentanecarboxamide;

N-(3-cyano-6-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;

N-(3-cyano-5,5,7,7-tetramethyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide;

N-(3-cyano-5-tert-pentyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
N-(3-cyano-6-tert-pentyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
N-(3-cyano-4,6-dimethyl-5,6-dihydro-4H-cyclopenta[b]thien-2-yl)-2-ethylbutanamide;
N-(3-cyano-7-phenyl-4,5,6,7-tetrahydro-1-benzothien-2-yl)-2-ethylbutanamide; and
5 3-cyano-N-(2,4-dichlorobenzyl)-2-[(2-ethylbutanoyl)amino]-N-isopropyl-4,5,6,7-tetrahydro-1-benzothiophene-7-carboxamide, or a pharmaceutically acceptable salt or solvate thereof.